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The Role of Individual Difference in Predicting Psychopathology Following Peer Victimization

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Abstract

Peer victimization is a common experience that is associated with later psychopathology. However, there is inconsistency in the strength and statistical significance of this effect. The current study used two methods to try to understand this inconsistency. First, co-occurring internalizing and externalizing symptoms were considered dimensionally. Second, the present study considered temperament as a potential moderator to explain the multifinality of outcomes that occur following peer victimization. A community sample (N = 387; 52% female) of early adolescents (11-15) from a longitudinal study of risk and resilience factors for psychopathology was utilized to test hypotheses. Cross-lagged examinations between victimization and psychopathology were examined, including the moderating effect of temperament. No longitudinal relationship between victimization and psychopathology was found. A significant interaction between victimization and effortful control predicted externalizing and co-occurring symptoms. Future researchers should consider improving the measurement of victimization and temperament to get a better understanding of the effect.

Key Words: Peer Victimization, Psychopathology, Temperament, Internalizing Symptoms, Externalizing Symptoms, Co-Occurring Symptom

Introduction

Peer victimization can be defined as repeated intentional aggression or threats of aggression by peers (Blakely-McClure & Ostrov, 2018; Zwierzynska, Wolke, & Lereya, 2012). Research has shown that peer victimization is a relatively common experience, particularly in late childhood and early adolescence. For instance, 40 percent of female middle school students and 33 percent of male middle school students report being victimized at school during the past year (Center for Disease Control, 2015). Peer victimization has also been associated with a number of negative outcomes, including the development of internalizing and externalizing problems (Kochenderfer & Ladd, 1996; Hanish & Guerra, 2002; Reijntjes et al., 2010a; Reijntjes, Kamphuis, Prinzie, & Telch, 2010b). Two meta-analyses, one looking at the relationship between victimization and internalizing symptoms and one looking at the relationship between victimization and externalizing symptoms, across developmental periods, (Reijntjes et al.; 2010a, Reijinties et al., 2010b) suggested that the strength and statistical significance of the effect of victimization on psychopathology varies from one study to another (73 percent significant and 70 percent significant). However, Reijinties and colleagues (2010a, 2010b) were not able to find any systematic differences in methodology between studies. Given the lack of a methodological explanation for the variability of the strength of the effect, the relationship between victimization and psychopathology may be moderated by other constructs. Another possibility is that the variability in the strength of the effect can be explained by the moderate to large correlation between internalizing and externalizing symptoms (Angold, Costello, & Erkanli 1999). The present study will address the aforementioned possibilities by testing whether temperament acts as a moderator of the relationship between victimization and

psychopathology while carefully modeling the co-occurrence of internalizing and externalizing symptoms.

Psychopathology and Peer Victimization

Research on psychopathology has indicated that externalizing and internalizing symptoms often co-occur (Angold, Costello, & Erkanli 1999). For example, a large epidemiological study found a correlation of $r = .48$ between externalizing and internalizing symptoms (Wright, Krueger, Hobbs, Markon, Eaton, & Slade, 2013). Individuals with co-occurring internalizing and externalizing symptoms often have a more chronic symptom trajectory and worse developmental outcomes than those who have only internalizing (pure internalizing) or externalizing symptoms (pure externalizing) alone (Angold, Costello & Erkanli, 1999; Briggs-Gowan, Carter, Bosson-Heenan, Guyer, & Horwitz, 2006; Fanti, & Henrich, 2010; Keiley, Lofthouse, Bates, Dodge, & Pettit, 2003; Oland, & Shaw, 2005). One explanation for the inconsistency in the relationship between internalizing and externalizing symptoms and victimization may be that previous studies did not consider other patterns of psychopathology. That is, studies of internalizing symptoms often do not include externalizing symptoms and vice versa. Furthermore, studies that do include both forms of psychopathology often use one or the other as a covariate, which removes co-occurring variance and assesses the interrelation of "pure" forms of internalizing and externalizing symptoms.

Previous research has considered the relationship between co-occurring symptoms and victimization. Eastman and colleagues (2018) used a latent profile analysis to examine symptom profiles among adolescents who had been victimized by peers. Five profiles emerged, four of which represented different patterns of co-occurring internalizing and externalizing problems. The fifth profile consisted of only 27 percent of the sample that was asymptomatic. None of their

symptom profiles represented “pure” internalizing or externalizing symptoms. Beyond the lack of “pure” internalizing or externalizing problems, 73 percent of their sample was in a profile that represented problem behavior. Greater amounts or frequency of victimization increased the likelihood of being included in the class with both high internalizing and high externalizing symptoms which was the class with the most severe problem behavior. The large percentage of youth with co-occurring symptoms suggests that it is very important to consider co-occurring symptoms when looking at the relationship between victimization and psychopathology.

While research such as Eastman and colleagues (2018), has given us insight into the importance of considering co-occurring symptoms as an outcome of victimization in adolescence, categorical approaches to psychopathology have methodological limitations. There is significant evidence that most psychological disorders are dimensional, not categorical (Haslam, Holland & Kuppens, 2012). In addition to this, all the disorders included in the internalizing and externalizing domains have been found to be dimensional (Haslam, Holland & Kuppens, 2012). As such, any groups created from symptom dimensions are arbitrary. Research has shown that creating arbitrary groups can lead to inaccurate and misleading results (MacCallum, Zhang, Preacher & Rucker, 2002). Furthermore, categorical approaches have been found to be less reliable and valid than dimensional approaches to psychopathology (Markon, Chmielewski, & Miller, 2011). One goal of this study is to test the relationship between victimization and psychopathology while considering “pure” and co-occurring psychopathology dimensionally. Clarifying the relationship between peer victimization and later psychopathology is an important contribution given that children with co-occurring psychopathology often struggle more than children with “pure” forms of psychopathology (Angold, Costello & Erkanli, 1999; Briggs-Gowan et al., 2006; Fanti, & Henrich, 2010; Keiley et al., 2003; Oland, & Shaw,

2005). Understanding factors that contribute to the development of co-occurring internalizing and externalizing symptoms is an important step for prevention and treatment.

Like psychopathology, researchers often consider distinct yet highly correlated subtypes of peer victimization (Casper, & Card, 2017). Physical victimization is violence or threats of violence by peers, and relational victimization is harm or threats of harm to someone's relationship or reputation (Blakely-McClure & Ostrov, 2018; Crick, Casas, & Ku, 1999). Considering both types of victimization is important since research has suggested differences in the prevalence of relational and physical victimization by gender and age (Casper & Card, 2017).

However, despite differences in prevalence, both relational and physical victimization have been found to be positively related to internalizing and externalizing symptoms (Casper & Card, 2017). Currently, research has been mixed when considering whether splitting relational and physical victimization improves prediction of later adjustment (Casper & Card, 2017; Eastman et al., 2018). Casper and Card (2017) did a cross sectional meta-analysis examining the question of how relational and physical victimization predicted different types of psychopathology in childhood and adolescence. Their results suggested that physical victimization and relational victimization are related to externalizing problems, but only relational victimization is related to internalizing problems (Casper & Card. 2017). However, one limitation of the Casper and Card study (2017) is that they did not look at co-occurring symptoms. A more recent study used groups to model co-occurrence and did not find differences in the effect of types of victimization on membership in groups high on internalizing or externalizing symptoms (Eastman et al., 2018). Given the mixed findings on the effectiveness of splitting relational and physical aggression coupled with the finding that both are positively

related to psychopathology, the current study will combine relational and physical victimization into a single victimization construct.

Multifinality Following Peer Victimization

Even though peer victimization increases the risk for later psychopathology, not everyone who experiences victimization will show symptoms of psychopathology (Center for Disease Control, 2015; Hanish & Guerra, 2002). One explanation for the inconsistency in the association between victimization and psychopathology is that there are moderators of the relationship. A moderator is a variable that changes the strength of the relationship between two other variables. Steinberg and Avenevoli (2000) suggest that multifinality in psychopathology is a function of the complex interplay between individual differences and stressful life events. Temperament can be conceptualized as, "constitutionally based individual differences in reactivity and self-regulation, in the domains of affect, activity, and attention" (Rothbart & Bates, 2006, p. 100). In contrast, victimization can be classified as a stressful life event (Arseneault, Bowes & Shakoor, 2010). Temperament has been found to predict the development of internalizing, externalizing and co-occurring symptoms and may have different relationships with different patterns of psychopathology (Keiley et al., 2003; Nigg, 2006; Scalco et al., 2012). Another objective of the current study is to test whether temperament moderates the effect of victimization to explain multifinality in psychopathology over time.

One commonly used model of temperament is Rothbart's model of temperament, which suggests that there are three broad dimensions of temperament: surgency (levels of sensation seeking, fear, and shyness), effortful control (levels of inhibitory control, activational control, and attention), and negative affectivity (levels of frustration/irritability, sadness/depressed mood; Rothbart & Bates, 2006; Rothbart, 2015). Across developmental periods low effortful control

and high surgency are related to externalizing symptoms (Eisenberg et al., 2009; Rothbart & Bates, 2006; Scalco et al., 2012; Wang, Eisenberg, Valiente, & Spinrad, 2016; Zhou, Lengua, & Wang, 2009). High negative affect has been related to externalizing symptoms, however, there may be a different relationship between externalizing symptoms and the two facets of negative affect (frustration and sadness/depressed mood). Eisenberg and colleagues (2009) found that while there is a positive relationship between high levels of anger/frustration and externalizing symptoms, sadness is unrelated to externalizing symptoms.

In contrast, internalizing symptoms have been related to low surgency and scoring high on both subscales of negative affect across developmental periods (Eisenberg et al., 2009; Rothbart & Bates, 2006; Leve, Kim, & Pears, 2005), while the relationship between internalizing symptoms and effortful control is less clear due to potential changes at different points in development (Eisenberg et al., 2009). Nonetheless, extreme ends of different temperament distributions are similarly and uniquely related to different patterns of psychopathology. Stressful experience, such as victimization, may affect youth with certain temperaments differently than other youth. For instance, youth with low effortful control or high frustration may struggle to manage behavior when provoked and have a stronger negative reaction to victimization, resulting in more aggression. If such youth find that aggression helps avoid future victimization, then they may be more likely to be aggressive in the future and develop externalizing symptoms. In contrast, if adolescents with low surgency or high negative affect experience victimization they may be more likely to withdraw or feel anxious in social situations, find themselves without friends, and potentially make the victimization worse (Boivin, Hymel, & Bukowski, 1995). Such a constellation of risk factors and sequelae may then lead to the subsequent development of internalizing symptoms.

Examining interactions between temperament and victimization might help differentiate who is most at risk for psychopathology. For example, in middle childhood, Sugimura, Rudolph, and Agoston (2014) found that the effectiveness of coping strategies for dealing with victimization to reduce psychopathology depended on the child's level of negative affect. Additionally, in another study, Sugimura and Rudolph (2012) found that at low levels of inhibitory control victimization to predicted aggression in girls in middle childhood. Reported findings suggest that the best strategy for dealing with victimization may depend on the child's temperament, and strategies that reduce symptoms of psychopathology for one child might increase symptoms of psychopathology in children with different temperament constellations. Given the evidence that the relationship between peer victimization and psychopathology varies by levels of temperament it may be that examining temperament as a moderator can help clarify the relationship between peer victimization and the development of psychopathology in adolescence.

Compared to internalizing and externalizing symptoms, there is less research considering the relationship between temperament and co-occurring symptoms. However, some studies have found that temperament has been linked to co-occurring symptoms. The primary finding has been that higher levels of negative affect, including frustration and depressed mood, are related to co-occurring symptoms in early adolescence (Wang et al., 2016). This aligns with previous research that has suggested higher levels of frustration are related to both internalizing and externalizing symptoms (Eisenberg et al., 2009). Additionally, co-occurring symptoms are related to lower levels of effortful control and executive function (Eisenberg et al., 2009; Martel et al., 2017; Scalco et al., 2012). More research in the area of peer victimization and co-occurring

symptoms would give us a better understanding of the relationship, and if it varies based on the child or adolescent's temperament.

Covariates

Gender. Gender may be related to peer victimization and psychopathology (Archer & Coyne, 2005; Blakely-Mcclure, & Ostrov, 2018; Carbone- Lopez, Esbensen, & Brick, 2010; Leadbeater, Kuperminc, Blatt & Hertzog, 1999; Nadeem & Graham, 2005). There are differences in the prevalence of victimization by gender, with girls experiencing slightly higher rates of victimization in early adolescence (CDC, 2015). The research on whether gender differentiates which children or adolescents develop psychopathology following victimization is less clear. While individual studies found mixed results, overall girls were slightly less likely to be victimized by peers but also more likely to develop psychopathology following peer victimization (Klomek, Sourander & Elonheimo, 2015). However, Klomek, Sourander and Elonheimo (2015) speculate that those results may be due to differences in prevalence by sex and not differences in reaction to victimization. There are also gender differences in the prevalence of types of psychopathology (Leadbeater et al., 1999). Girls are at a greater risk for developing internalizing disorders and boys are more at risk for externalizing disorders (Leadbeater et al., 1999). Overall, it is clear that gender is related to victimization and psychopathology but whether gender changes the relationship between victimization and psychopathology has been mixed (Klomek, Sourander & Elonheimo, 2015; Sugimura & Rudolph, 2012).

Age. Age may affect the relationship between victimization and psychopathology (Nadeem & Graham, 2005). Adolescents who are further into puberty are at greater risk for psychopathology after experiencing victimization (Nadeem & Graham, 2005). Additionally, the prevalence of internalizing disorders significantly increases during adolescence (Merikangas, He,

Brody, Fisher, Bourdon & Koretz, 2010). However, studies that have taken a trajectory approach show that for the majority of adolescent's internalizing symptoms decrease or remain stable while a small portion increase (Dekker, Ferdinand, Van Lang, Bongers, Van Der Ende & Verhulst, 2007). The research on both prevalence of externalizing symptoms and trajectories is mixed, with differences depending on the specific disorder (Leve, Kim, & Pears, 2005; Merikangas et al., 2010; Moffitt & Caspi, 2001). Nonetheless, given that age is related to victimization and some forms of psychopathology consistently, age may be related to both peer victimization and psychopathology making it a confounder and important to include in our analytic models.

Summary and Present Study

Few studies have considered the effect of victimization on internalizing, externalizing, and co-occurring symptoms while considering symptoms dimensionally. It is possible that the inconsistency in the strength of the relationship between peer victimization and psychopathology in prior studies may be due to this gap in the literature. Importantly, not all youth who experience victimization report later psychopathology, which suggests that moderators are involved in the multifinality of victimization. Given that different extremes in temperament have already been linked to different patterns of psychopathology, temperament is a potential individual difference that may modulate the impact of victimization on later psychopathology. While previous research has considered how interactions between victimization and temperament predict depression and externalizing symptoms (Sugimura, Rudolph, & Agoston, 2014; Sugimura, & Rudolph, 2012), similar models have not been tested for co-occurring symptoms or internalizing symptoms other than depression. Temperament has been related to psychopathology and in some

cases, is a more powerful predictor than other correlates such as parenting (Rothbart & Bates, 2006).

The current study will test whether victimization predicts “pure” internalizing, “pure” externalizing and co-occurring symptoms over time, as well as the potential moderating influence of temperament. A bifactor model will be used to split variance in psychopathology into “pure” internalizing, “pure” externalizing, co-occurring symptoms and error. This model works by separating components of variance instead of creating groups allowing the current study to consider psychopathology dimensionally while also examining co-occurring symptoms. For more information on bifactor modeling see (Reise, Moore, & Haviland, 2010) and (Colder et al. 2013) for an applied example. The effects of victimization on psychopathology will be examined using data from a longitudinal study involving three assessment waves with an age range from 11 to 15. Examining what predicts psychopathology across different assessments allows us to test if pathways are consistent from late childhood to early adolescence.

Figure 1. Full-Proposed Model

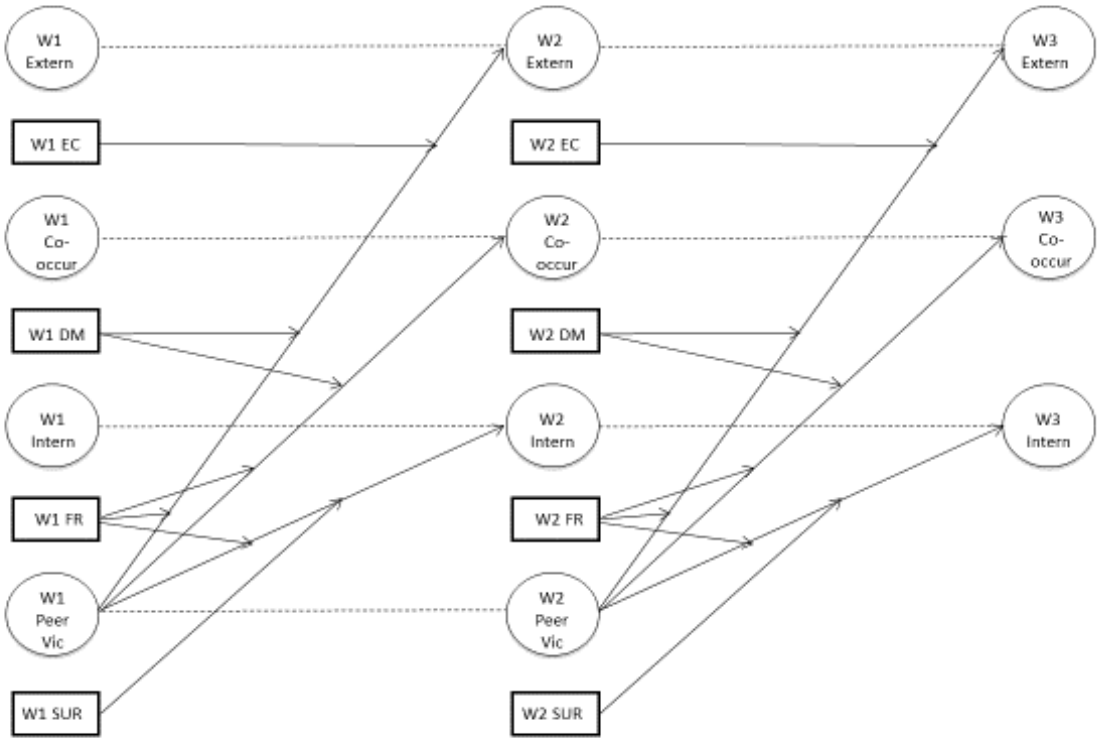

Figure 1. Dotted lines indicate controlling for earlier levels of a construct, Extern = Externalizing symptoms, Intern = Internalizing symptoms, Co-occur = Co-occurring internalizing and externalizing symptoms, Peer Vic = Peer Victimization, EC = Effortful Control, SUR = Surgency, DM = Depressed Mood, FR = Frustration. All victimization and temperament constructs predicted all psychopathology constructs however, only the hypothesized relationships are shown in the figure. All constructs were allowed to covary at each wave, but are not shown in the figure to simplify.

Late childhood and early adolescence are particularly good ages to look at the relationship between victimization and adjustment because adolescents are particularly sensitive to the social environment (Spear, 2011). After puberty, youth typically spend more time with peers and less time with families (Larson, & Richards, 1991). For this reason, disruptions in the social environment, such as victimization, could be particularly damaging in late childhood and

early adolescence. Given high levels of victimization in middle and high school (Center for Disease Control, 2015), the current study will focus on predicting changes in psychopathology during a sensitive and important developmental period.

The first hypothesis is that low effortful control or high frustration in conjunction with victimization will increase the risk for "pure" externalizing disorders. Children and adolescents with less effortful control or high frustration may be more likely to act aggressively when victimized. The second hypothesis is that low surgency or high negative affect in conjunction with victimization will increase the risk for internalizing disorders. Children and adolescents with low levels of surgency or high negative affect may react and experience higher levels of sadness and frustration and be more likely to withdraw when social situations are difficult. Finally, it is hypothesized that high negative affect and or low effortful control in conjunction with victimization will increase the risk for co-occurring symptoms. Higher levels of negative affect seem to be connected to both internalizing and externalizing symptoms, and, therefore, it would make sense for higher levels of negative affect to be related to co-occurring symptoms. Additionally, low levels of effortful control have been previously related to co-occurring symptoms and "pure" externalizing symptoms (Eisenberg et al., 2009). Children and adolescents with higher levels of negative affect or lower levels of effortful control may be more vulnerable to experiencing negative emotion when they are victimized or be unable to control their actions in response to their emotions. This could lead to both internalizing and externalizing problems.

Method

Participants

Participants were part of a longitudinal study of adolescents recruited between ages 10 and 12. Families lived in Erie County New York and were contacted using random digit dialing. An adolescent and parent participated in each family. The sample consisted of 387 families, from which an adolescent and caregiver participated. The average age for the target adolescents was 11.58 years (SD = 0.88) at wave one (W1) and they were 52 percent female. The racial demographics for the sample were: 75 percent Caucasian, 15 percent Black or African American, 3 percent Hispanic, 2 percent Pacific Islander and 5 percent selecting another race or ethnicity, which is representative of the demographics of the area (U.S. Census Bureau, 2010-2017). Retention from the first to the third assessment was strong with only 7 percent attrition. Differences between families that completed all assessment and families who missed at least one assessment were examined in a previous project (Colder et al., 2017). No significant differences were found between the participants and the missing families on any of the baseline variables included in the current study. A marginally significant difference in externalizing symptoms was found (p = .06). However, the effect was small (Cohen's d = .27). Additionally, the current study will use full information maximum likelihood (FIML) to estimate parameters for the full sample (N = 387). As such, it is unlikely that attrition affected the study outcome.

Procedures

Families came to university research facilities for three assessments, each approximately a year apart. Each interview took about 2 and a half hours to complete. Parents first provided consent and adolescent assent. Then, parents and adolescents were taken to separate rooms to protect

their privacy. Families were compensated $75 for the first interview, $85 for the second interview, and $100 for the third interview. The University at Buffalo IRB approved procedures and compensation.

Measures

Table 1

Descriptive Statistics

Construct	Mean	SD	Range
Peer Victimization W1	1.38	0.40	1 - 3
Peer Victimization W2	1.36	0.38	1 - 3
Peer Victimization W3	1.32	0.38	1 - 3
Effortful Control W1	3.36	0.64	1 - 5
Effortful Control W2	3.39	0.65	1 - 5
Effortful Control W3	3.41	0.60	1 - 5
Surgency W1	3.68	0.55	1 - 5
Surgency W2	3.57	0.51	1 - 5
Surgency W3	3.64	0.54	1 - 5
Negative Affect W1	2.99	0.54	1 - 5
Negative Affect W2	2.88	0.50	1 - 5
Negative Affect W3	2.82	0.51	1 - 5
Internalizing Symptoms W1	0.26	0.21	0 - 2
Internalizing Symptoms W2	0.23	0.23	0 - 2
Internalizing Symptoms W3	0.23	0.24	0 - 2
Externalizing Symptoms W1	0.24	0.18	0 - 2
Externalizing Symptoms W2	0.24	0.20	0 - 2
Externalizing symptoms W3	0.26	0.22	0 - 2

Table 2

Reliability for Study Variables

Variable	α
Internalizing Symptoms W1	0.83
Externalizing symptoms W1	0.85
Peer Victimization W1	0.80
Effortful Control W1	0.89
Surgency W1	0.81
Depressed Mood W1	0.72
Frustration W1	0.75
Internalizing Symptoms W2	0.88
Externalizing symptoms W2	0.89
Peer Victimization W2	0.80
Effortful Control W2	0.90
Surgency W2	0.75
Depressed Mood W2	0.72
Frustration W2	0.72
Internalizing Symptoms W3	0.88
Externalizing Symptoms W3	0.89

Parent Report of Temperament. The Early Adolescent Temperament Questionnaire (EATQ-R; Capaldi, & Rothbart, 1992) is a commonly used scale for parent report of adolescent temperament. It produces 10 scales, namely activation control, affiliation, attentional control, fear, frustration, sensitivity to reward, inhibitory control, aggression, depressed mood, and shyness. The subscales can be combined to create the three domains. The fear, shyness, and sensitivity to reward subscale make the surgency domain. Effortful control is made up of inhibitory control, activation control, and attentional control. Frustration and depressed mood are

combined to create negative affect. The EATQ-R has been shown to have good validity (Capaldi & Rothbart, 1992; Ellis, & Rothbart, 2001). The questionnaire gives 62 statements and the parent is asked how much each describes their child. Parents rate items on a scale from 1 - 5, with 1 being "almost always untrue," 2 being "usually true," 3 which is "sometimes true," 4 which is "usually true," and 5 which is, "almost always true."

Adolescent Report of Psychopathology. The youth self-report form (YSR; Achenbach & Rescola, 2001) is a commonly used adolescent report measure of both internalizing and externalizing symptoms that is part of the Achenbach System of Empirically Based Assessment (ASEBA) The YSR is designed for adolescents 11-18 years of age. The 112 items are rated from 0 "not true" to 2 which is "very true or often true". An example internalizing item is, "I am too shy or timid". "I break rules at home, school, or elsewhere" is an example of an externalizing item. The YSR has been shown to be a reliable and valid measure of psychopathology in adolescents (Achenbach & Rescola, 2001). Achenbach and Rescorla (2001) tested their measure on a community sample. The scores in the current sample were consistent with the values Achenbach and Rescorla (2001) provided for a community sample. For example, 11-18-year-old females and males in their sample reported an average T-score of around 54 for anxious depressed, withdrawn depressed, rule-breaking, and aggressive behavior scales, and in our current sample, these T-scores ranged from 51 to 55 for females and males.

Adolescent Report of Victimization. Peer victimization was assessed with questions focusing on aggression adapted from The Perception of Peer Support Scale (PPS) similar to Kochenderfer and Ladd (1996). A sample item is, "Other kids pick on me at school". Each item is rated from 1, "never" to 3, "a lot". The PPS scale has been found to be sufficiently reliable and valid

(Kochenderfer & Ladd, 1996). In the current study, reliabilities were good at both W1 and wave two (W2). Cronbach's alpha can be found in Table 2.

Data Analysis

The first step in testing the bifactor model was to create four random bundles for internalizing and externalizing symptoms. Additionally, one bundle was created for internalizing and one for externalizing symptoms of items that have been found to only load on the co-occurring factor (see Colder et al., 2013). The 10 random bundles were used to create the bifactor model. The five internalizing bundles load on a "pure" internalizing factor as well as a co-occurring factor. The five externalizing random bundles loaded on a "pure" externalizing factor as well as the co-occurring factor. The three latent factors were not allowed to correlate with each other. The bifactor model separated the total variance in psychopathology into four orthogonal parts: "pure" internalizing, "pure" externalizing, co-occurring internalizing and externalizing, and error. Factor scores were saved for "pure" internalizing, "pure" externalizing, and co-occurring symptoms at W1, W2, and, wave three (W3) and regressions from W1 to W2 and from W2 to W3 were estimated separately. The models were run separately because including the bifactor model and predictors in the same model resulted in more parameters than the number of participants.

Each structural regression model was used to examine whether victimization predicted psychopathology across two waves of longitudinal data controlling for prior levels of psychopathology in each model. Gender and age were used as covariates in both regressions. Temperament constructs were examined as moderators of the relationship between victimization and problem behaviors. To do this, peer victimization and the four temperament constructs, namely depressed mood/sadness, frustration, surgency, and effortful control, were mean-

centered. Next, interactions terms were created by multiplying peer victimization and the temperament constructs. All temperament constructs, peer victimization, gender, age and earlier levels of psychopathology were included in each regression, as well as interactions between each temperament construct and victimization. Additionally, victimization and temperament have been found to correlate with psychopathology (Casper & Card, 2017; Rothbart & Bates, 2006). As such, the covariance structure among predictors was also included at each wave. Finally, significant interactions were explored using the Johnston-Neyman technique. The Johnston-Neyman technique is a method that tests which regions on the moderator are associated with a significant relationship between the independent and dependent variables.

Results

The current analyses had six steps. First random bundles were created to be used as the 10 indicators for the bifactor model. Second, a measurement model was created for each wave of psychopathology (W1-W3). Third, the measurement model was tested for measurement invariance. Fourth, factor scores for psychopathology were saved to be used in each regression. Fifth, the variables were added to models predicting psychopathology at W2 and W3 and r^2 was compared to the measurement model to determine how much additional variance each predictor explained. Sixth, any significant interactions were analyzed for regions of significance.

Random bundles were created using SAS software version 9.4 (SAS Institute, Cary NC) and then data were transferred to Mplus version 8 (Muthén & Muthén, 1998-2017) and a measurement model was estimated. Satorra Bentler (SB) nested chi-square tests were used to test for improvement in model fit when adding auto-covariances among repeated measures and to test for measurement invariance across waves. SB nested chi-square tests indicated that adding auto-covariances among the same indicators across waves improved model fit (Δx^2 [30] = 265.29, $p < .01$). Constraining factor loadings, error variances, intercepts and auto-covariances across time did not result in a decrement to model fit (Δx^2 range [df range= 16 - 34] = 0.59 – 33.50, all *ps* > .17). The final model with factor loadings, error variance, intercepts, and auto-covariance equality constraints had excellent fit to the data with the exception of SRMR which was good: X^2 = 516.23 (438), p = .006; RMSEA = .021 (90% confidence interval (CI) = .012 - .028); CFI = .99; TLI = .99; SRMR = .06. Next, factor scores were saved for all psychopathology constructs and entered into separate regressions for each lag, namely for the W1 to W2 and for the W2 to W3 lags, respectively. Factor scores were allowed to covary. Both the models with the factor scores had excellent fit, W1 to W2: X^2 = 20.68 (19), p = 0.35; RMSEA = .02 (90% CI = .000 - .048); CFI = .99; TLI = .99; SRMR = .01, and W2 to W3: X^2 = 49.91 (25), p = .002;

RMSEA = .05 (90% CI = .03 - .07); CFI = .98; TLI = .97; SRMR = .04. Figure 1 shows the full final model including all the hypothesized paths.

Comparing the final model from W1 to W2 to a model with the measurement model showed that very little additional variance was explained by temperament and victimization. Four-tenths of a percent more variance was explained in both internalizing and externalizing symptoms and 0.9 percent more variance was explained in co-occurring symptoms. The change in variance explained from W2 to W3 was similarly small with internalizing symptoms changing 0.01 percent, externalizing symptoms changing 0.08 percent, and two percent more variance explained in co-occurring symptoms. A change of 1% of the variance is considered the lower bound of a small effect. The only change that met that criteria was co-occurring symptoms from W2 to W3. Given the minimal contribution of the independent variables and moderators in predicting psychopathology, it is not surprising that few significant relationships were found. The only predictor found to significantly predict internalizing symptoms was gender from W2 to W3.

From W1 to W2 there was a significant interaction between victimization and effortful control that significantly predicted externalizing symptoms. This interaction was further probed using a regions of significance test. Victimization was significantly related to later externalizing symptoms when effortful control was below the mean, namely between -2.51 and -0.64. Within that range, at low levels of effortful control, externalizing symptoms decreased as levels of victimization increased. For reference, the standard deviation of effortful control was 0.97, suggesting that the relationship between externalizing symptoms and victimization was negative only when victimization was approximately two-thirds of a standard deviation below the mean to

a little over 2.5 standard deviations below the mean. The simple slope was not significant at high levels of effortful control.

Table 3

Bifactor Model Results W1 to W2

IV	Intern W2	Extern W2	Co-occur W2
Intern W1	0.74*	-	-
Extern W1	-	0.93*	-
Co-occur W1	-	-	-0.77*
Age	-0.02	0.01	0.01
Gender	0.02	-0.01	-0.01
Frustration W1	-0.00	0.01	-0.01
Effortful Control W1	0.01	-0.02	-0.04
Surgency W1	-0.01	0.02	0.06
Depressed Mood W1	0.03	-0.01	0.04
Peer Victimization W1	-0.04	0.00	-0.05
Victimization* Frustration	0.01	0.03	0.07
Victimization * Effortful Control	-0.03	0.05*	0.08*
Victimization* Surgency	0.03	0.01	0.02
Victimization * Depressed Mood	-0.03	0.00	-0.01

Note: * = p is less than 0.05, values reported are standardized betas, intern = internalizing symptoms, extern = externalizing symptoms, co-occur = co-occurring symptoms.

Figure 2. Peer Victimization Predicting Externalizing Symptoms

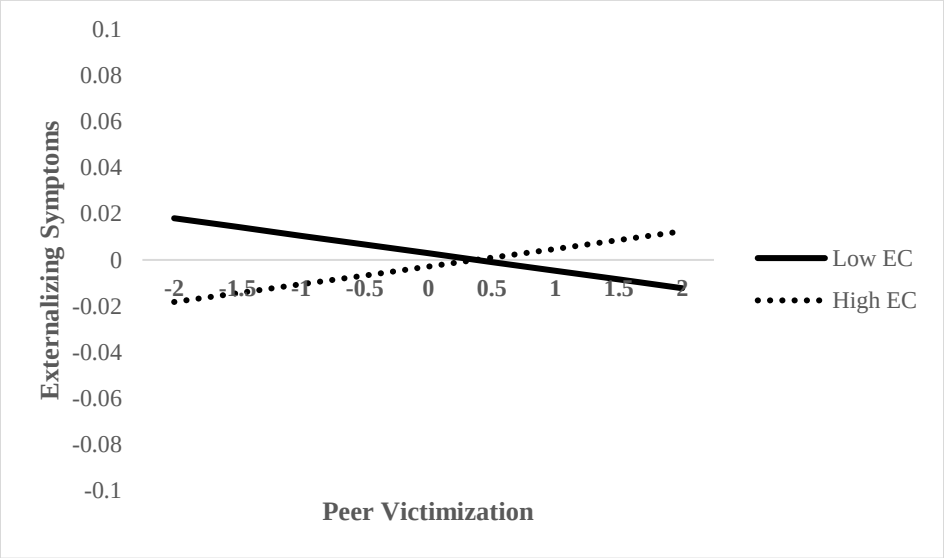

Figure 2. EC = Effortful Control, standard deviation of effortful control = 0.97

Similarly, co-occurring symptoms were predicted by an interaction between victimization and effortful control from W1 to W2. The region of significance test revealed that this interaction was only significant below the mean, namely between -4.64 and -0.13, suggesting that the relationship was significant from approximately 4.5 standard deviations below the mean to nearly the mean of effortful control. Within that range, at low levels of effortful control, co-occurring symptoms decreased as levels of victimization increased. The slope was insignificant at high levels of effortful control. From W2 to W3 none of the hypothesized interactions were significant. The only significant paths included a negative effect of effortful control, a positive effect of gender on co-occurring symptoms, and a positive effect of gender on internalizing symptoms. In the current dataset, a positive effect of gender means that females are more likely to exhibit the symptoms than males.

Table 4

Bifactor Model Results W2 to W3

IV	Intern 3	Extern 3	Co-occur 3
Intern 2	0.91*	-	-
Extern 2	-0.85*	-	
Co-occur 2	-	-0.86*	
Age	-0.03	0.03	0.01
Gender	0.05*	0.04	0.11*
Frustration W2	-0.01	-0.03	-0.02
Effortful Control W2	0.02	-0.07	-0.09*
Surgency W2	-0.02	-0.03	0.01
Depressed Mood W2	0.02	0.01	0.02
Peer Victimization W2	0.00	-0.01	-0.07*
Victimization W2 * Frustration W2	0.01	-0.01	-0.02
Victimization W2 * Effortful Control W2	0.01	-0.02	-0.02
Victimization W2 * Surgency W2	0.01	-0.04	0.04
Victimization W2 * Depressed Mood W2	-0.02	-0.02	0.01

Note: * = p is less than 0.05, values reported are standardized betas, intern = internalizing symptoms, extern = externalizing symptoms, co-occur = co-occurring symptoms

Figure 3. Peer Victimization Predicting Co-occurring Symptoms

A number of correlations were significant within wave. At W1, internalizing symptoms were significantly negatively related to both externalizing symptoms and positively related to co-occurring symptoms. At W2, co-occurring symptoms were significantly negatively related to internalizing and externalizing symptoms. Internalizing and externalizing symptoms were also negatively related. However, the effects sizes of all relationships were small. Peer victimization was significantly positively related to psychopathology within wave at W1 and W2, which is consistent with prior literature (Casper, & Card, 2017). The effects ranged from small to medium. Internalizing symptoms had a small but significant relationship with victimization at both waves while externalizing symptoms had a small relationship at W1 and a moderate relationship at W2. On the other hand, co-occurring symptoms had a moderate relationship with peer victimization at both waves and was larger than the other relationships at each wave. At both W1 and W2, peer victimization was positively related to depressed mood and frustration. While there is limited previous literature, one study did conflict with this finding in that a non-significant relationship was found between negative affect and peer victimization (Sugimura &

Rudolph, 2012). At both waves, peer victimization was negatively related to effortful control, which is consistent with previous literature (Sugimura & Rudolph, 2012). All the effect sizes for the relationships between temperament and victimization were small.

Table 5

Correlations between Study Variables at W1

Variables	Int	Ext	Co	Age	Gen	FR	EC	SR	DM	PV	PVXFR	PVXEC	PVXSR	PVXDM
Int	1.00													
Ext	-0.23*	1.00												
Co	0.23*	0.16	1.00											
Age	-0.05	0.00	0.11*	1.00										
Gen	0.09	-0.27*	-0.13*	0.06	1.00									
FR	-0.06	0.16*	0.16*	-0.03	0.04	1.00								
EC	0.10 *	-0.25*	-0.29*	-0.05	0.22*	-0.41*	1.00							
SR	-0.09	0.13*	0.02	-0.06	-0.00	-0.10*	0.13*	1.00						
DM	0.10	-0.04	0.21*	-0.05	0.06	0.43*	-0.37*	-0.35*	1.00					
PV	0.17*	0.19*	0.41*	-0.07	-0.12*	0.18*	-0.23*	0.05	0.20*	1.00				
PVXFR	-0.01	0.10	0.14	-0.07	-0.10*	0.12	-0.16*	-0.03	0.11	0.19	1.00			
PVXEC	-0.03	-0.10	-0.21*	-0.10	0.07	-0.17*	0.12	0.06	-0.18*	-0.29*	-0.50*	1.00		
PVXSR	0.07	0.00	-0.01	-0.07	0.00	-0.04	0.06	0.07	-0.02	-0.03	-0.15	0.20	1.00	
PVXDM	0.04	0.08	0.14*	0.00	-0.08	0.12	-0.18*	-0.02	0.16	0.28*	0.52*	-0.48*	-0.41*	1.00

Note: Int = internalizing symptoms, Ext = externalizing symptoms, Co = co-occurring symptoms, Gen = gender, FR = frustration, EC = effortful control, SR = surgency, DM = depressed mood, PV = peer victimization, X = multiplied by.

Table 6

Correlations between Study Variables at W2

Variables	Int	Ext	Co	Age	Gen	FR	EC	SR	DM	PV	PVXFR	PVXEC	PVXSR	PVXDM
Int	1.00													
Ext	-0.18*	1.00												
Co	0.22*	0.23*	1.00											
Age	-	-	-	1.00										
Gen	-	-	-	0.06	1.00									
FR	-0.01	0.15*	0.19*	-0.04	0.06	1.00								
EC	0.10	-0.19*	-0.22*	-0.00	0.22*	-0.42*	1.00							
SR	-0.18*	0.09	-0.01	-0.04	0.06	-0.10	0.16*	1.00						
DM	0.15*	-0.06	0.22*	-0.02	0.08	0.43*	-0.31*	-0.34*	1.00					
PV	0.19*	0.32*	0.43*	-0.12*	-0.02	0.13*	-0.22*	0.08	0.18*	1.00				
PVXFR	0.11	0.02	0.04	-0.10	-0.05	0.04	-0.08	0.05	0.09	0.12	1.00			
PVXEC	-0.10	-0.02	-0.06	0.04	0.08	-0.07	0.08	0.01	-0.15*	-0.25*	-0.34*	1.00		
PVXSR	0.07	-0.05	-0.02	-0.04	-0.03	0.05	0.01	-0.02	0.09	-0.06	0.03	0.19*	1.00	
PVXDM	0.04	0.03	0.05	-0.08	-0.07	0.08	-0.14	0.07	0.06	0.24	0.43*	-0.43	-0.28*	1.00
PVXDM	0.04	0.08	0.14*	0.00	-0.08	0.12	-0.18*	-0.02	0.16	0.28*	0.52*	-0.48*	-0.41*	1.00

Note: Int = internalizing symptoms, Ext = externalizing symptoms, Co = co-occurring symptoms, Gen = gender, FR = frustration, EC = effortful control, SR = surgency, DM = depressed mood, PV = peer victimization, X = multiplied by, values not included in the table were paths included in the regressions.

Discussion

The current study examined if temperament and peer victimization interacted to predict later internalizing, externalizing, and co-occurring symptoms in late childhood and early adolescence. Previous research yielded inconsistent results regarding the magnitude of the effect between peer victimization and psychopathology (Reijntjes et al., 2010a; Reijntjes et al., 2010b). This study hoped to clarify when the relationship existed by looking at moderators and using a dimensional bifactor model of psychopathology. It was hypothesized that 1) low effortful control, or high frustration at high levels of victimization would increase the risk for "pure" externalizing disorders, 2) low surgency or high negative affect at high levels of victimization would increase the risk for internalizing disorders, and 3) high negative affect and or low levels of effortful control in conjunction with high levels of victimization would increase the risk for co-occurring symptoms. The current study did not find support for the hypothesis that victimization would increase later psychopathology. In fact, from W2 to W3 there was a negative relationship between peer victimization and later co-occurring symptoms. Furthermore, hypothesized interactions were either not-significantly related to later psychopathology or were related in the opposite direction as predicted.

Peer Victimization on Psychopathology

A previous study of adolescents found a positive relationship between victimization and co-occurring symptoms (Eastman et al., 2018), while we found a moderated effect which suggested that victimization reduced psychopathology at different extremes of temperament. There are several key differences between the Eastman and colleagues (2018) study and the current study. First, the Eastman and colleagues' study (2018) measured all the constructs at one time point. The current study was looking at lagged effects of victimization on later

psychopathology. Victimization was correlated positively to "pure" internalizing, "pure" externalizing and co-occurring symptoms within wave at W1, W2, and W3. The relationship with co-occurring symptoms was particularly strong and consistent. It may be that peer victimization and psychopathology are correlated but peer victimization does not predict psychopathology later in time. Previous research has shown that adolescent relationships change frequently during adolescence (Poulin & Chan, 2010). It may be that peer victimization a year ago no longer has a strong effect on psychopathology.

Another possibility is that peer victimization captured at earlier waves had already affected psychopathology precluding a causal relationship in early adolescence. Power to detect a relationship between psychopathology and victimization could have also been an issue in the present study. Given the variability in the size of the effect found previously, it is hard to estimate what the size of the effect is (Reijntjes et al., 2010a; Reijntjes et al., 2010b). However, when looking at the average effect across studies, two meta-analyses estimated the effects to be small from peer victimization to internalizing symptoms (r = 0.18, 95% CI: 0.12, 0.24); Reijintjes et al., 2010a) and from peer victimization to externalizing symptoms (r = 0.14, 95% CI 0.09, 0.19); Reijintjes et al., 2010b). While the current study was designed to have a large enough sample to detect small effects, another issue is that it is a community sample in late childhood and early adolescence. Therefore, we have relatively low rates of psychopathology. At the first wave, the mean of internalizing symptoms was only 0.26 on a scale from 0 to 2 and the mean of externalizing symptoms was 0.24 on the same scale. The small size of the effect and the low levels of psychopathology may have combined to make it so the current study was unable to detect the effects that were hypothesized.

One major difference between the methods used in the two meta-analyses (Reijintjes et al., 2010a; Reijintjes et al., 2010b) and the current study is that the current study considered co-occurring symptoms. As such, it could be that modeling co-occurring symptoms in a bifactor model alters results. Additionally, the meta-analyses included constructs that are similar to psychopathology like proactive aggression and loneliness. While these constructs may overlap with psychopathology, they are not a clinical diagnosis or distributions of symptoms per se. It may be that peer victimization has a stronger relationship to other factors such as aggression or loneliness than the clinical syndromes.

Moderating Effects of Temperament

Similar to the effects of peer victimization on later psychopathology, the hypotheses concerning temperament and victimization interactions were not supported. From W1 to W2, effortful control and victimization interacted to predict externalizing and co-occurring symptoms. However, it was hypothesized that at low levels of effortful control and high levels of victimization externalizing symptoms would increase and the opposite was found. At low levels of effortful control, as victimization increased, externalizing decreased. While the interaction effect found was small, it was surprising given that it contradicted prior research. A previous study (Sugimura & Rudolph, 2012) found a positive relationship between victimization and psychopathology at low levels of inhibitory control, with lower victimization being associated with lower psychopathology. Inhibitory control, which is the ability to resist a dominate response in order to achieve a goal, is one of the subscales that make up effortful control. The contradictory study (Sugimura & Rudolph, 2012) was focused on middle childhood and not late childhood and adolescence like the current study. Additionally, the Sugimura and Rudolph (2012) study looked at aggression not externalizing symptoms and did not consider co-occurring

symptoms. Alternatively, the contradictory findings may be due to different relationships between the lower-level facets of each temperament construct and victimization. The current study chose to focus on the higher-order factors of temperament in all cases except negative affect because the facets of the effortful control and surgency domains tend to relate similarly to psychopathology (Rothbart & Bates, 2006), and in the current sample some of the subscales did not demonstrate good reliability (e.g. for the fear subscale $\alpha = 0.51$).

At low levels of effortful control, co-occurring symptoms also decreased as victimization increased. The effect of effortful control on the relationship between co-occurring symptoms and victimization was also small. Similar to externalizing symptoms it was hypothesized that there would be a positive relationship between victimization and co-occurring symptoms at low levels of effortful control. The results are surprising given that low effortful control is considered a risk factor for co-occurring symptoms (Eisenberg et al., 2009). However, it should be noted that the effect of effortful control on externalizing and co-occurring symptoms was negative at both waves. This is an important distinction because it shows that the current study is consistent with previous studies that have examined the relationship between psychopathology and effortful control (Eisenberg et al., 2009). What differs from prior research is the moderated effect.

Given that there is limited research testing temperament as a moderator of the victimization and psychopathology relationship, it could be that low levels of effortful control protect against developing co-occurring or externalizing symptoms following victimization during late childhood and early adolescence. To the researcher's knowledge, there are only two studies that find interactions between temperament and victimization and both examine middle childhood (Rudolph & Agoston, 2014; Sugimura & Rudolph, 2012). The differences between studies may be due to the differences in age. If the effect of peer victimization on

psychopathology is only during certain developmental periods then studies using different samples will get different results. The results may also have varied by gender, which the current study was not able to examine. While the current study used gender as a confounding variable, three-way interactions between gender, temperament and victimization were not included. Sugimura and Rudolph (2012) found that the effects of peer victimization on later psychopathology differed by type of victimization (physical or relational) and child gender in middle childhood. It could be that considering three-way interactions with gender and examining different types of victimization may help explain results from the current study as the current study considered gender a covariate and not a moderator.

Finally, measurement issues may have affected the results. Rothbart's temperament scales may not fit the subscales structure that is commonly sued (Kotelnikova, Olino, Klein, Kryski & Hayden, 2016). A study done on the Child Behavior Questionnaire (CBQ), which is the temperament scale designed based on the same theory of temperament for young children, found that the effortful control and negative affect scales were not distinct (Kotelnikova et al., 2016). Items that were supposed to load on the effortful control scale loaded on the negative affect scale and vice versa. While the questions on the EATQ are not identical to the CBQ, they are based on the same item pool and were only adjusted for the developmental period. Therefore, the EATQ likely shares the issue of the CBQ and effortful control and negative affect have a large degree of overlap. Given that effortful control and negative affect were both in the model in the present study the amount of overlapping variance removed could be part of the reason that the hypothesized effects were not found.

Limitations

While the current study had a number of strengths, it also had limitations. One limitation was that the measure of victimization was short and did not distinguish between different types of victimization. Being able to parse physical and relational victimization as separate constructs may have produced different results. One meta-analysis looking at the cross-sectional effect of peer victimization on psychopathology found significant differences in the effect of physical and relational victimization on internalizing symptoms but not externalizing symptoms (Casper, & Card, 2017). However, to the researcher's knowledge, there is not currently good research on the effect of splitting victimization into physical and relational components longitudinally. Future researchers might explore if splitting relational and physical victimization provides more specificity in examining the longitudinal relationship between peer victimization and psychopathology.

The current study also did not examine if victimization by temperament interactions varied by gender, which previous studies have indicated may be important (Sugimura & Rudolph, 2012). However, the present study did not have the power to examine three-way interactions. Future studies could examine if there are gender differences in how temperament moderates the effect of peer victimization on later psychopathology

Importantly, factor scores were used instead of latent factors to assess psychopathology. As such, measurement error could not be completely removed from the psychopathology constructs. This means that some of the variance in the dependent variables might have actually been error and affected the estimation of the beta coefficients. Future research should consider using latent psychopathology constructs to rule out this alternative explanation.

Finally, a community sample was utilized for the present study, which has the advantage of allowing the researcher to compare people who are not at risk for psychopathology to those

who are and to assess differences in outcomes. However, necessarily, there were lower levels of psychopathology than a higher risk sample. Using a community sample makes effects on psychopathology more difficult to detect because there are lower rates of psychopathology. Future studies should consider examining the effect of peer victimization using different sampling techniques and comparing the results.

Conclusions

The current study tested the relationship between victimization and psychopathology in a novel way. Psychopathology was modeled using a bifactor model and temperament by victimization interactions were used to predict different patterns of psychopathology. Surprisingly, this study did not find a positive relationship between victimization and psychopathology. Also unexpectedly, in late childhood, the relationship between victimization and externalizing and co-occurring symptoms was negative at low levels of effortful control. This finding contradicted previous research and more research is needed to fully understand why the relationship is the opposite of what was hypothesized.

While the present study did not reveal specific factors that clarify the relationship between victimization and the development of later psychopathology it did highlight some interesting areas for future research. First, while a number of studies have looked at the question of how victimization affects psychopathology, there have been various inconsistencies in measurement and definitions of constructs that make it hard to determine if there is actual inconsistency or just inconsistency of methods. For example, both physical and relational peer victimization should be considered separately to determine if there is a difference between the two in relation to psychopathology. Another construct in our study that had measurement issues was temperament. Despite its popularity, there are potential limitations to the CBQ and EATQ,

particularly when considering effortful control and negative affect (Estave, Kotelnikova, Scalco, Lengua, & Colder; 2020; Kotelnikova et al., 2016). Given that negative affect and effortful control were both hypothesized to interact with victimization to predict later psychopathology, psychometric issues with these scales may have affected the results. Finally, how researchers measure and conceptualize psychopathology also matters. While the current study did not find different results when considering co-occurring symptoms, the overall literature still supports including them (Eastman et al., 2018). When considering cross-sectional results, this study found a stronger relationship between co-occurring symptoms and victimization then either of the "pure" dimensions of psychopathology. The strength of the cross-sectional relationship makes the lack of a longitudinal relationship between victimization and co-occurring symptoms surprising. It may be that the current study did not have the power to detect the effect. Given that co-occurring symptoms may be related to victimization, researchers should include them or at least discuss how the overlap between internalizing and externalizing symptoms was handled. Also, researchers should explore if victimization is truly related to clinical symptoms of psychopathology or if they are more related to feelings of loneliness or higher tendencies toward aggression, which alone are not a clinical diagnosis.

Future research may benefit from considering the relationship between victimization and psychopathology within and across time points. Victimization may cause changes in later psychopathology or it may only be relevant to psychopathology at the current time point. The present study did not find cross-lagged results of victimization on later psychopathology but did find an association within wave. That may be a function of lower levels of psychopathology in a community sample combined with controlling for prior psychopathology or it may be that

victimization only has a short-term effect. It is also possible that the causal arrow goes the other way. That is, perhaps psychopathology increases victimization.

Finally, there could be additional moderators of the relationship between victimization and psychopathology. At high levels of effortful control, victimization was negatively related to psychopathology, which was the opposite of what was expected based on theory. From only one study it is unclear if this is a spurious finding. Additionally, a number of interactions between temperament and psychopathology that were hypothesized were not found. Repeating the current study with different measures or a different type of sample could help clarify our results. If we want to fully understand the issue of which children struggle following victimization, researchers need to more carefully consider how constructs are measured and continue looking for moderators of the relationship.

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Vita

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